3.6.5 *Clifton Court Forebay and Bethany Reservoir*

Priority Actions

1. Develop and implement watershed management programs for Clifton Court Forebay and Bethany Reservoir to address nutrients and pathogens.

   Much of the land surrounding Clifton Court Forebay and Bethany Reservoir is used for agriculture and livestock grazing. While there is no watershed around Clifton Court Forebay, some agricultural drains directly discharge to Clifton Court. Additionally, pollution from stormwater runoff can occur. Although these watersheds cannot contribute large amounts of pollutants, every pound of the pollutants is carried off with the diverted water. A watershed management program, similar to that initiated by NBA users at Barker Slough, is recommended to address nutrient and microbial pathogen pollution from agricultural activities, particularly livestock operations. As BMPs are developed for these activities, they could be implemented in these small watersheds. Stakeholders should be included in further delineation of potential sources of contaminants and in implementation of BMPs to reduce loading of contaminants.

   While there is no watershed around Clifton Court Forebay, some agricultural drains directly discharge to Clifton Court.

2. Evaluate impacts of new wastewater discharges to the Delta.

   Population expansion into the Delta area is resulting in plans to increase wastewater discharges to the Delta. For example, the wastewater treatment plant for Discovery Bay discharges near Clifton Court Forebay and the CCWD Old River intake. The current plan for expansion is a 50% increase in capacity at the Discovery Bay wastewater facility. Another example is the new Mountain House community located east of the Tracy Pumping Plant that may, ultimately, need to discharge wastewater to Delta channels. Increased loadings and impacts of such discharges need to be evaluated and addressed as part of the comprehensive CALFED Drinking Water Quality Improvement Strategy.

   The current plan for expansion is a 50% increase in capacity at the Discovery Bay wastewater facility.

3. Control algae in Clifton Court Forebay.

   The control of algae in Clifton Court Forebay is addressed earlier in Section 3.6.4, "South Bay Aqueduct."

Information Needed

1. Identify and mitigate high-impact agricultural drains near Clifton Court.

   Discharges nearest to drinking water intakes can substantially degrade water quality at the intakes. For example, Byron Tract was noted as having drainage substantially poorer in quality than water found in Delta channels. The impacts of these sources need to be better characterized. Detailed studies should be conducted on the drains in the immediate area of Clifton Court, including modeling of loads. Depending on the results of these studies, this action could be followed by BMPs.

   Discharges nearest to drinking water intakes can substantially degrade water quality at the intakes.

2. Determine algae mitigation in Clifton Court Forebay.

   Studies are needed to determine the best methods of algae removal or avoidance for the Clifton Court Forebay area.

Existing Activities

1. Control of flows and water levels by barriers and operational changes.

   The use of barriers and operational changes to improve south Delta water levels and redirect San Joaquin River flows to protect fish may affect water quality at Clifton Court. This is an ongoing activity that is being considered by DWR with the CALFED storage and Delta conveyance actions (under projects of the Interim South Delta Program [ISDP]). Continuing studies should include evaluations of water quality impacts and modification of plans, as needed, to avoid negative water quality impacts.

   The use of barriers and operational changes to improve south Delta water levels and redirect San Joaquin River flows to protect fish may affect water quality at Clifton Court.

3.6.6 Contra Costa Water District Intakes

CCWD intakes include Mallard Slough, Rock Slough, and Old River.

Priority Actions

1. Relocate, reduce, or eliminate agricultural drainage into Rock Slough.

   Current studies indicate that relocation or treatment of agricultural drainage from Veale Tract may be the most effective means to reduce impacts on the Rock Slough intake; however, other forms of source reduction, control, and management can be investigated within the scope of the CALFED Program. CCWD has developed a proposal for a feasibility study of mitigation measures

   Current studies indicate that relocation or treatment of agricultural drainage from Veale Tract may be the most effective means to reduce impacts on the Rock Slough intake.

for drainage into Rock Slough. One possibility would be to relocate the discharge to Sand Mound Slough downstream of the one-way gates.

Drainage from Byron Tract also has the potential to affect CCWD's drinking water intake on Old River near Highway 4. Relocation of discharges and other forms of management to reduce these impacts should implemented with CALFED support.

As part of the approach to solving problems of discharges near drinking water intakes, a watershed management strategy will be used to identify stakeholders, develop a consensus approach, and monitor water quality. Studies by CCWD are ongoing to further determine impacts from Veale Tract discharges. CALFED funding for this pilot project and for CCWD's Byron Tract program is recommended.

Information Needed

1. Determine impacts from the Veale Tract drain and the Discovery Bay discharge point.

   Studies by CCWD are ongoing to further determine impacts from the Veale Tract drain and the Discovery Bay discharge point. Funding for these studies is recommended.

2. Study the control of agricultural drainage near intakes.

   CCWD considers management and control of local drainage to be among the most cost-efficient means of improving source water quality impacts at urban intakes in the Delta. Drainage control programs may be effective near the Old River intake. Actions could include treatment, volume reduction through MPs, consolidation of discharges, or relocation of the point of discharge. Studies by CCWD are underway to evaluate these possibilities. Development and implementation of BMPs through a watershed stakeholder process should be supported by CALFED.

CCWD considers management and control of local drainage to be among the most cost-efficient means of improving source water quality impacts at urban intakes in the Delta.

Existing Activities

1. Study concerning relocation of Veale Tract agricultural drain.

   CCWD has already spent considerable time on the study to relocate the Veale Tract agricultural drain. Continuance of the study is recommended.

3.6.7 Delta-Mendota Canal at the City of Tracy Intake

Priority Actions

1. Evaluate the water quality impacts associated with discharging the City of Tracy wastewater treatment plant effluent near the City's drinking water intake, and the impacts of potential discharges from the new Mountain House community under development east of the Central Valley Project (CVP) Tracy Pumping Plant.

   The City of Tracy drinking water intake is in the DMC. The DHS believes that drinking water quality might be adversely affected by discharges from the City's wastewater treatment facility into Old River. These discharges are expected to increase over time as the population of Tracy expands. The City of Tracy is considering moving its intake to the SWP. CALFED should support further evaluation of this action to protect the City of Tracy's drinking water quality.

The City of Tracy drinking water intake is in the DMC. The DHS believes that drinking water quality might be adversely influenced by discharges from the City's wastewater treatment facility into Old River.

Information Needed

1. Identify and characterize drains near the City of Tracy intake.

   Discharges nearest to drinking water intakes may pose the greatest risks for adverse impacts on water quality. For Tracy, these drains have not been identified and characterized adequately. Focused studies on several drains in the vicinity of the Tracy intake is recommended.

3.6.8 San Joaquin River

Priority Actions

1. Establish a watershed management program for the San Joaquin River.

   A San Joaquin River Watershed Program should be established that is similar in scope to the Sacramento River Watershed Program. Such a program could address both drinking water and ecosystem concerns in the San Joaquin River watershed.

A San Joaquin River Watershed Program should be established that is similar in scope to the Sacramento River Watershed Program.

2. Address drainage problems in the San Joaquin Valley to improve downstream water quality.

   This action will include implementing recommendations from the San Joaquin Valley Drainage Implementation Program; identifying and supporting innovative drainage management programs; and supporting voluntary land retirement programs for drainage-impaired lands, with local sponsorship. This action includes CALFED actions, which target approximately 35,000 acres of land retirement and complementary land retirement actions under other programs. These actions include:

   - Finalize the State Basin Plan Amendment and TMDL for salinity in the lower San Joaquin River by the end of 2001.
   - Begin implementation of appropriate source control measures (for example, on-farm and district actions, development of treatment technology, real-time management, and reuse projects such as agroforestry) by the end of 2003.

Information Needed

1. Determination of the concentrations, loads, and sources of organic carbon, TDS, bromide, nutrients, and pathogens in the San Joaquin River watershed.

   The CMARP should include monitoring of the San Joaquin River for key drinking water parameters, such as organic carbon and pathogens. Where permitted discharges may affect drinking water quality, key drinking water parameters should be included in NPDES permits.

The CMARP should include monitoring of the San Joaquin River for key drinking water parameters, such as organic carbon and pathogens.

Existing Activities

1. Testing of San Joaquin River.

   DWR, USGS, and the CVRWQCB have performed extensive testing on the San Joaquin River. The City of Stockton has run models on DO levels in the vicinity of the City of Stockton. Additional studies are proposed.

3.6.9 California Aqueduct

Priority actions involve the portion of the California Aqueduct south of O'Neill Forebay and Check 13.

Priority Actions

Much of the land surrounding the southern portions of the California Aqueduct is used for agriculture and grazing. A number of agricultural drains directly affect the Aqueduct, and large stretches of the Aqueduct are not adequately protected from stormwater runoff that is impaired by soil erosion or agricultural and livestock runoff. Other major drinking water conveyance channels have similar runoff problems. CALFED agencies will implement appropriate physical modification and watershed management programs to correct this problem. Specific actions include:

1. Control drainage of stormwaters into the aqueduct by physical modification of facilities.

   The introduction of stormwater runoff that might be affected by agricultural and livestock operations and by soil erosion is a primary problem identified for the San Luis Canal section of the California Aqueduct (which runs from near Los Banos to near Kettleman City). Sediment, TDS, pathogens, and nutrients that stimulate algal growth may enter the system in this way. In addition, this reach of aqueduct is not well protected from stormwater runoff. The SSAC has instituted actions to control entry of stormwater. CALFED will initiate a comprehensive evaluation of necessary physical modifications (for example, modifications to berms, bypasses, and stormdrains to divert storm-water away from, and prevent its discharge into, the Aqueduct and similar conveyance channels) by the end of 2001. CALFED then will identify and begin implementation of necessary physical improvements by the end of 2005.

   The introduction of stormwater runoff that might be affected by agricultural and livestock operations and by soil erosion is a primary problem identified for the San Luis Canal section of the California Aqueduct.

2. Develop and implement a watershed management program to minimize drainage impacts on the aqueduct.

   Much of the land surrounding the southern reaches of the California Aqueduct is used for agriculture and livestock grazing. A number of agricultural drains directly affect the aqueduct. Pump-in from groundwater programs during drought emergencies also can degrade water quality. A watershed manage-ment program, including projects for Arroyo Pasajero, has been developed to address nutrient, sediment, and pathogen pollution from these activities. Implementation of the watershed program would include forming a stakeholder group of landowners, urban water managers, DWR, SSAC, and others, to identify BMPs in order to reduce loading of contaminants and to

   Much of the land surrounding the southern reaches of the California Aqueduct is used for agriculture and livestock grazing.

initiate corrective actions. CALFED then will develop and implement watershed management programs adjacent to appropriate conveyance channels by the beginning of 2004.

Existing Activities

The SSAC is considering design and implementation of appropriate modifications, including berms, bypasses, and storm drains, to divert stormwater away from and prevent its discharge into the aqueduct. Such activities could be made eligible for CALFED funding.

3.6.10 Southern California

Priority Actions

1. Facilitate water quality exchanges and similar programs to make high-quality Sierra water in the eastern San Joaquin Valley available to urban southern California interests.

   For example, MWD and the Friant Water Users Authority and its member agencies have commenced preliminary discussions to accomplish these objectives and to improve water supply reliability for the agricultural districts. CALFED will work to assure that these efforts and others are consistent with overall programs to restore the upper San Joaquin River. Specific actions include:

   - Initiate evaluations and studies of potential infrastructure improvements by December 2000.
   - Complete feasibility studies and implement selected demonstration projects by the end of 2001.
   - Complete environmental review and begin implementation of a long-term program, including necessary infrastructure, by the end of 2004.

2. Develop and implement a watershed management program to control nutrients, turbidity, and pathogens.

   Local drainage and runoff in the Castaic Lake and Lake Silverwood watersheds may contribute pathogens, nutrients, and turbidity to the SWP reservoirs. Sources of contaminants in these watersheds include recreational use in the watersheds, highway and road runoff, wastewater treatment system spills or failures, and livestock grazing. Livestock grazing operations in the

Local drainage and runoff in the Castaic Lake and Lake Silverwood watersheds may contribute pathogens, nutrients, and turbidity to the SWP reservoirs.

watersheds around the reservoirs may result in increases in nutrient and pathogen loadings. Presently, sheep grazing occurs in the Castaic Lake watershed on a seasonal basis on lands owned by DWR and the BLM; however, no grazing occurs in the Lake Silverwood watershed. Development of a watershed management plan to control local sources of drinking water contaminants to the reservoirs is desirable.

The watershed management plan should address land development and land use in the watersheds of SWP reservoirs, including activities on state and federal lands. Fire management plans also should be developed as a component of watershed management plans. Development of a watershed management plan would involve forming a stakeholder group of landowners, the SSAC, BLM, U.S. Forest Service (USFS) and others. The group would identify sources of contaminants and feasible source control measures to reduce contaminant loadings to the reservoirs. Source control measures could include creation of buffer zones for animal grazing activities, and construction of flow-through wetlands and stormwater detention basins to improve storm runoff water quality before it reaches the reservoirs (i.e., similar to the Drainage Water Quality Management Plan for the Lake Mathews watershed).

3. Control body-contact recreational use to minimize microbial pathogens from humans.

There is a need to ensure that pathogens, specifically *Cryptosporidium*, *Giardia*, and potentially viruses, do not occur in the SWP aqueduct and reservoirs. Future drinking water regulations may include more stringent disinfection requirements to control these pathogens. Modeling studies for Eastside Reservoir clearly show increasing microbial pathogen loads in storage reservoirs as a result of body-contact recreation. It is recognized that, from a source water protection standpoint, elimination of all body contact in reservoirs that are used to store drinking water sources would be desirable. Since these reservoirs are SWP reservoirs and are designated as multi-use waters, full restriction is likely not to be possible. Therefore, restriction of swimming to physically separate swimming lagoons may help to minimize pathogen loading and maintain the multi-purpose concept of the facilities. CALFED should support evaluation of methods to manage body-contact recreation in order to minimize pathogen loading from such activities without causing unacceptable restrictions to recreational use.

Future drinking water regulations may include more stringent disinfection requirements to control pathogens.

4. Evaluate structural alternatives at Castaic Lake and Elderberry Forebay to control algae.

On the West Branch of the SWP, water enters Castaic Lake from Elderberry Forebay. After major T&O-producing algae blooms at Castaic Lake in 1993 and 1994, MWD and DWR conducted a study to evaluate the relationship

between releases from Elderberry Forebay and T&O problems in Castaic Lake. They evaluated mixing and water transport mechanisms associated with T&O events, and identified operational and engineering strategies to manage T&O events in Castaic Lake. The engineering strategies involve modifications to the outlet at Elderberry Forebay in order to reduce mixing and transport of malodorous compounds from the surface where they are produced to the deepest reaches of the lake. The engineering strategies require further feasibility studies before implementation. CALFED should support such feasibility studies.

5. Provide secondary containment for all sanitary facilities at SWP terminal reservoirs.

   Spills from wastewater collection, transport, and treatment systems and sanitary facilities (including chemical toilets and floating toilets) at SWP reservoirs can contribute pathogens and other pollutants to the reservoirs. To reduce the risk of pollution from spills or failures of sanitary facilities, it is recommended that all sanitary facilities at SWP reservoirs be equipped with secondary containment structures. CALFED should support the implementation of this action and coordinate this effort with DWR, Department of Parks and Recreation, SWP contractors, and local sanitary districts.

Spills from wastewater collection, transport, and treatment systems and sanitary facilities (including chemical toilets and floating toilets) at SWP reservoirs can contribute pathogens and other pollutants to the reservoirs.

6. Control recreational boating use to minimize pollution from MTBE.

   Two-cycle engines are considered major contributors of MTBE and other fuel contaminants in source waters, particularly in storage reservoirs. Some utilities already have banned the use of two-cycle engines on some reservoirs. The most recent information on MTBE indicates that it does not pose a human health risk in reservoirs, as once thought. CALFED should continue to monitor technical developments regarding human health risk and MTBE. Should a significant risk be identified, CALFED should institute water quality actions to eliminate the risk.

Information Needed

1. Conduct studies to determine impacts of recreational activities.

   Aside from the studies to determine methods of reducing the impacts of body-contact recreation and recreational boating in terminal reservoirs, no other studies are proposed.

Existing Activities

1. Program to detect algae blooms.

   Since 1973, DWR has maintained a biological surveillance program to detect algal blooms in the reservoirs of the Southern Field Division of the SWP and to provide early warning to urban water contractors. The MWD has begun algae studies in the terminal reservoirs to determine mechanisms for reducing algal production.

   MWD also is conducting studies to evaluate local drainage and stormwater runoff to Castaic Lake and Lake Silverwood as potential sources of pathogens.

3.7 CAPACITY FOR REDUCING BROMIDE AND ORGANIC CARBON THROUGH WATER QUALITY PROGRAM ACTIONS

The importance of bromide to the CALFED Program resulted in the formation of a panel of independent experts to evaluate the significance of bromide to the CALFED selection of a Preferred Program Alternative.

The CALFED Phase II Report identifies bromide as a critical constituent with respect to selection of a Preferred Program Alternative. Bromide is critical because the selection of storage and conveyance options has the potential to profoundly affect bromide concentrations in municipal water supplies diverted from the Delta. Figures 4 and 5 illustrate this potential. The importance of bromide to the CALFED Program resulted in the formation of a panel of independent experts to evaluate the significance of bromide to the CALFED selection of a Preferred Program Alternative. The panel report is attached in its entirety as Appendix E.

Bromide is present in sea water. Bromide enters into Delta drinking water supplies primarily through mixing with waters of San Francisco Bay and the Pacific Ocean.

Bromide is present in sea water. Bromide enters into Delta drinking water supplies primarily through mixing with waters of San Francisco Bay and the Pacific Ocean. This section will demonstrate that the ocean is, in fact, the source of most of the bromide in the Bay-Delta estuary system. Other sources of bromide may exist, however, and CALFED needs to evaluate these sources and to institute corrective actions where feasible in order to reduce their contributions. Organic carbon can be reduced through treatment, either at the source or at drinking water treatment facilities. Because of the importance of organic carbon as a reactant chemical in the formation of DBPs, it is desirable to control sources of organic carbon through specific water quality actions in addition to whatever improvements would be provided through changed storage or conveyance mechanisms.